

WHAT IS CLAIMED IS:

1. An apparatus for positioning a first axle with respect to a vehicle frame adapted for use with the first axle and a second axle, said vehicle frame having an inner wall portion, an outer wall portion and a frame cavity, said inner wall portion defining a proximate opening extending into the frame cavity, said outer wall portion defining a distal opening extending into the frame cavity, said vehicle frame further having a vehicle frame bore extending from the frame cavity, the apparatus comprising:
  - 5 an axle coupler adapted for engaging the first axle;
  - 10 an adjustor member adapted to fit in the frame cavity and for movement longitudinally within the frame cavity, said adjustor member having a bearing surface adapted to engage the axle coupler when the axle coupler is in engagement with the first axle; and
  - 15 an actuator adapted for insertion into the vehicle frame bore and adapted to move the adjustor member longitudinally within the frame cavity.
2. The apparatus of claim 1, further comprising a frame cover piece adapted to cover at least a portion of the frame proximate opening when the adjustor member is in the frame cavity, said cover piece having a cover piece opening adapted to permit a portion of one of the axle coupler and the first axle to extend through the cover piece opening when the axle coupler is in engagement with the first axle.
3. The apparatus of claim 1 wherein the vehicle frame is one of a motorcycle frame, a bicycle frame and a tricycle frame.
- 25 4. The apparatus of claim 1 wherein the axle coupler is further adapted for insertion into the frame cavity through the vehicle frame distal opening.
5. The apparatus of claim 1 wherein the axle coupler has a generally cylindrically-shaped portion and wherein the adjustor member bearing surface defines an opening adapted to mate with the axle coupler.

6. The apparatus of claim 1 wherein the vehicle frame bore extends longitudinally from the frame cavity through the frame in a direction generally away from the first axle and the second axle and wherein the actuator comprises an elongated threaded member.

5        7. The apparatus of claim 6 wherein the adjustor member has a threaded bore in register with the vehicle frame bore when the adjustor member is disposed in the frame cavity and wherein the elongated threaded member is adapted to engage the adjustor member threaded bore.

10        8. The apparatus of claim 1, wherein the axle coupler has a proximate end adapted to engage the first axle and a distal end, and wherein the axle coupler distal end is disposed within the vehicle frame cavity when the axle coupler is in engagement with the first axle.

15        9. The apparatus of claim 1, wherein no portion of the axle coupler extends outside of the frame cavity through the vehicle frame distal opening when the axle coupler is in engagement with the first axle.

20        10. The apparatus of claim 1, wherein the axle coupler has a body and a threaded extension and wherein the first axle has a threaded bore adapted to engage the threaded extension.

25        11. The apparatus of claim 10, further comprising a frame cover piece adapted to cover at least a portion of the frame proximate opening when the adjustor member is in the frame cavity, said cover piece having a cover piece opening adapted to permit the coupler threaded extension to extend through the cover piece opening when the threaded extension is in engagement with the first axle threaded bore.

30        12. The apparatus of claim 11 wherein the first axle has an end, wherein the first axle threaded bore has an opening at the first axle end, wherein the cover piece has an outer surface and an inner surface, and wherein the cover piece is further adapted to permit at least a portion of the axle end to abut the outer surface of the cover piece and to permit at least a portion of the axle coupler body to abut the inner surface of the cover piece when the threaded extension is in engagement with the first axle threaded bore.

13. The apparatus of claim 1, wherein the axle coupler comprises a nut and the first axle has external threads adapted to mate with the nut.

5        14. An apparatus for positioning a first axle with respect to a vehicle frame adapted for use with the first axle and a second axle, said vehicle frame having an inner wall portion, an outer wall portion and a frame cavity, said inner wall portion defining a proximate opening extending into the frame cavity, said outer wall portion defining a distal opening extending into the frame cavity, said vehicle frame further having a vehicle  
10 frame bore extending longitudinally from the frame cavity through the frame in a direction generally away from the first axle and the second axle, the apparatus comprising:

an axle coupler adapted for insertion through the vehicle frame distal opening and for engaging the first axle;

15        an adjustor member adapted for insertion into the frame cavity through the proximate opening and for movement longitudinally within the frame cavity, said adjustor member having a bearing surface adapted to engage the axle coupler when the axle coupler is in engagement with the first axle, said adjustor member further having an adjustor member coupler adapted for alignment with the vehicle frame bore when the adjustor member is disposed in the frame cavity;

20        an actuator adapted for insertion into the vehicle frame bore and for engagement with the adjustor member coupler, said actuator being further adapted to move the adjustor member longitudinally within the frame cavity; and

25        a frame cover piece adapted to cover at least a portion of the frame proximate opening and to secure the adjustor member in the frame cavity, said cover piece having a cover piece opening adapted to permit a portion of one of the axle coupler and the first axle to extend through the cover piece opening when the axle coupler is in engagement with the first axle.

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15. The apparatus of claim 14, wherein the axle coupler has a proximate end adapted to engage the first axle and a distal end, and wherein the axle coupler distal end is disposed within the vehicle frame cavity when the axle coupler is in engagement with the first axle.

16. The apparatus of claim 14, wherein no portion of the axle coupler extends outside of the frame cavity through the vehicle frame distal opening when the axle coupler is in engagement with the first axle.

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17. The apparatus of claim 14, wherein the axle coupler has an elongated threaded member and the first axle has a threaded bore adapted to engage the elongated threaded member.

10 18. The apparatus of claim 14, further comprising a plurality of screws adapted to secure the frame cover piece to the frame.

15 19. An apparatus for positioning a first axle with respect to a cycle frame adapted for use with the first axle and a second axle, said first axle having a generally cylindrically-shaped side wall and a generally planar axle end wall, said first axle further having an internally-threaded axle bore extending coaxially into the axle end wall, said cycle frame having an inner wall portion, an outer wall portion and a frame cavity, said inner wall portion defining a proximate opening extending into the frame cavity, said outer wall portion defining a distal opening extending into the frame cavity and disposed generally on the opposite side of the frame cavity as the proximate opening, said cycle frame having a cycle frame bore extending longitudinally from the frame cavity through the frame in a direction generally away from the first axle and the second axle, the apparatus comprising:

20 an axle bolt having a generally cylindrically-shaped body portion with a distal end wall and a proximate end wall, said axle bolt further having a threaded extension projecting from the proximate end wall and adapted to engage with the axle bore, said body portion and threaded extension being further adapted for insertion through the cycle frame distal opening;

25 an adjustor member adapted for insertion into the frame cavity through the proximate opening and for movement longitudinally within the frame cavity, said adjustor member having a member opening adapted to surround at least a portion of the axle bolt body portion, said adjustor member further having a threaded adjustor bore adapted for alignment

with the cycle frame bore when the adjustor member is disposed in the frame cavity;

an adjustor bolt adapted for insertion through the cycle frame bore and for engagement with the adjustor bore; and

5 a frame cover piece adapted to cover at least a portion of the frame proximate opening and to secure the adjustor member in the frame cavity, said cover piece having a cover piece opening adapted to permit the axle bolt threaded extension to extend through the cover piece opening for engagement with the axle bore;

10 wherein the axle bolt distal end wall is disposed within the frame cavity when the adjustor member is disposed in the frame cavity, when the at least part of the axle bolt body portion is surrounded by the adjustor member opening, and when the axle bolt threaded extension is engaged with the axle bore.

15 20. A cycle frame for use with a first axle and a second axle, comprising:  
a plurality of frame interior walls forming a frame cavity wherein one of said plurality of interior walls has a cycle frame bore extending from the frame cavity;  
a frame inner wall portion defining a proximate opening extending into the frame cavity;  
20 a frame outer wall portion defining a distal opening extending into the frame cavity;  
an axle coupler adapted for engaging the first axle;  
an adjustor member adapted to fit in the frame cavity and for movement  
25 longitudinally within the frame cavity, said adjustor member having a bearing surface adapted to engage the axle coupler when the axle coupler is in engagement with the first axle; and  
an actuator adapted for insertion into the cycle frame bore and adapted to move the adjustor member longitudinally within the frame cavity.

30 21. The cycle frame of claim 20 wherein the axle coupler is further adapted for insertion into the frame cavity through the cycle frame distal opening.

22. The cycle frame of claim 20 wherein the axle coupler has a generally cylindrically-shaped portion and wherein the adjustor member bearing surface defines an opening adapted to mate with the cylindrically-shaped portion of the axle coupler.

5        23. The cycle frame of claim 20, further comprising a frame cover piece adapted to cover at least a portion of the frame proximate opening when the adjustor member is in the frame cavity, said cover piece having a cover piece opening adapted to permit a portion of one of the axle coupler and the first axle to extend through the cover piece opening when the axle coupler is in engagement with the first axle.

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24. The cycle frame of claim 20 wherein the cycle frame bore extends longitudinally from the frame cavity through the frame in a direction generally away from the first axle and the second axle and wherein the actuator comprises an elongated threaded member.

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25. The cycle frame of claim 24 wherein the adjustor member has a threaded bore in register with the cycle frame bore when the adjustor member is disposed in the frame cavity and wherein the elongated threaded member is adapted to engage the adjustor member threaded bore.

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26. The cycle frame of claim 20, wherein the axle coupler has a proximate end adapted to engage the first axle and a distal end, and wherein the axle coupler distal end is disposed within the cycle frame cavity when the axle coupler is in engagement with the first axle.

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27. The cycle frame of claim 20, wherein no portion of the axle coupler extends outside of the frame cavity through the cycle frame distal opening when the axle coupler is in engagement with the first axle.

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28. The cycle frame of claim 20, wherein the axle coupler has a body and a threaded extension and wherein the first axle has a threaded bore adapted to engage the threaded extension.

29. A motorcycle comprising:  
a first axle and a second axle;  
a cycle frame;  
a motor mounted on the cycle frame;  
5 a plurality of frame interior walls forming a frame cavity wherein one of said plurality of interior walls has a cycle frame bore extending from the frame cavity;  
a frame inner wall portion defining a proximate opening extending into the frame cavity;  
10 a frame outer wall portion defining a distal opening extending into the frame cavity;  
an axle coupler adapted for engaging the first axle;  
an adjustor member adapted to fit in the frame cavity and for movement  
15 longitudinally within the frame cavity, said adjustor member having a bearing surface adapted to engage the axle coupler when the axle coupler is in engagement with the first axle; and  
an actuator adapted for insertion into the cycle frame bore and adapted to move  
the adjustor member longitudinally within the frame cavity.

20 30. The motorcycle of claim 29 wherein the axle coupler is further adapted for insertion into the frame cavity through the cycle frame distal opening.

25 31. The motorcycle of claim 29 wherein the axle coupler has a generally cylindrically-shaped portion and wherein the adjustor member bearing surface defines an opening adapted to mate with the cylindrically-shaped portion of the axle coupler.

30 32. The motorcycle of claim 29, further comprising a frame cover piece adapted to cover at least a portion of the frame proximate opening when the adjustor member is in the frame cavity, said cover piece having a cover piece opening adapted to permit a portion of one of the axle coupler and the first axle to extend through the cover piece opening when the axle coupler is in engagement with the first axle.

33. The motorcycle of claim 29 wherein the cycle frame bore extends longitudinally from the frame cavity through the frame in a direction generally away from

the first axle and the second axle and wherein the actuator comprises an elongated threaded member.

34. The motorcycle of claim 33 wherein the adjustor member has a threaded bore  
5 in register with the cycle frame bore when the adjustor member is disposed in the frame cavity and wherein the elongated threaded member is adapted to engage the adjustor member threaded bore.

35. The motorcycle of claim 29, wherein the axle coupler has a proximate end  
10 adapted to engage the first axle and a distal end, and wherein the axle coupler distal end is disposed within the cycle frame cavity when the axle coupler is in engagement with the first axle.

36. The motorcycle of claim 29, wherein no portion of the axle coupler extends  
15 outside of the frame cavity through the cycle frame distal opening when the axle coupler is in engagement with the first axle.

37. The motorcycle of claim 29, wherein the axle coupler has a body and a threaded extension and wherein the first axle has a threaded bore adapted to engage the  
20 threaded extension.

38. A method of positioning a first axle with respect to a vehicle frame adapted for use with the first axle and a second axle, said vehicle frame having an inner wall portion, an outer wall portion and a frame cavity, said inner wall portion defining a proximate opening extending into the frame cavity, said outer wall portion defining a  
25 distal opening extending into the frame cavity, the method comprising:

inserting an adjustor member having a bearing surface into the frame cavity;  
inserting an axle coupler into the frame cavity so that at least a part of the axle  
coupler engages the bearing surface of the adjustor member;  
30 engaging the first axle with the axle coupler; and  
moving the adjustor member longitudinally within the frame cavity with an  
actuator.

39. The method of claim 38 wherein the vehicle frame further has a vehicle frame bore, the method further comprising the step of inserting the actuator into the vehicle frame bore.

5        40. The method of claim 38 wherein the adjustor member has an adjustor member coupler, the method further comprising the step of engaging the actuator with the adjustor member coupler.

10      41. The method of claim 38 wherein the step of inserting the adjustor member into the frame cavity further comprises inserting the adjustor member into the frame cavity through the proximate opening.

15      42. The method of claim 38 wherein the vehicle frame further has a vehicle frame bore extending longitudinally from the frame cavity through the frame in a direction generally away from the first axle and the second axle, and wherein the actuator has an elongated threaded member.

20      43. The method of claim 42 wherein the adjustor member has an adjustor member threaded bore adapted for alignment with the vehicle frame bore when the adjustor member is in the frame cavity, the method further comprising the step of engaging the adjustor member threaded bore with the elongated threaded member.

25      44. The method of claim 38 wherein the step of inserting the axle coupler further comprises inserting the axle coupler into the frame cavity through the vehicle frame distal opening.

30      45. The method of claim 38 further comprising the step of covering at least a portion of the frame proximate opening with a frame cover piece having a cover piece opening adapted to permit a portion of one of the axle coupler and the first axle to extend through the cover piece opening when the axle coupler is in engagement with the first axle.

46. The method of claim 38 wherein the axle coupler has a generally cylindrically-shaped portion and wherein the adjustor member bearing surface defines an opening adapted to mate with the generally cylindrically-shaped portion.

5       47. The method of claim 38, wherein the axle coupler has a proximate end and a distal end, wherein the first axle engages the axle coupler at the proximate end, and wherein the axle coupler distal end is disposed within the frame cavity when the axle coupler is in engagement with the first axle.

10       48. The method of claim 38, wherein no portion of the axle coupler extends outside of the frame cavity through the frame distal opening when the axle coupler is in engagement with the first axle.

15       49. The method of claim 38, wherein the axle coupler comprises an elongated threaded member and the first axle has a threaded bore adapted to mate with the elongated threaded member.

20       50. The method of claim 38, wherein the axle coupler includes an internally-threaded portion and the first axle has external threads adapted to mate with the internally-threaded portion.

25       51. An apparatus for positioning a first axle with respect to a vehicle frame having an inner wall portion, an outer wall portion and a frame cavity, said inner wall portion defining a proximate opening extending into the frame cavity, said outer wall portion defining a distal opening extending into the frame cavity, said vehicle frame further having a vehicle frame bore extending from the frame cavity, the apparatus comprising:

30              an adjustor member adapted to fit in the frame cavity and for movement longitudinally within the frame cavity, said adjustor member having a bearing surface;

            means for coupling the first axle to the adjustor member, said coupling means being adapted for insertion through the vehicle frame distal opening; and

            means for moving the adjustor member longitudinally within the frame cavity when the first axle is coupled to the adjustor member.

52. The apparatus of claim 51 wherein the vehicle frame is adapted for use with  
the first axle and a second axle, and wherein the vehicle frame bore extends  
longitudinally from the frame cavity through the frame in a direction generally away from  
5 the first axle and the second axle.

53. The apparatus of claim 51, wherein the coupling means has a proximate end  
and a distal end, the proximate end being adapted to couple the first axle to the adjustor  
member, and wherein the coupling means distal end is disposed within the frame cavity  
10 when the first axle is coupled to the adjustor member.

54. The apparatus of claim 51, wherein no portion of the coupling means extends  
outside of the frame cavity through the frame distal opening when the first axle is coupled  
to the adjustor member.

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